

AVIATION WEEK

A McGRAW-HILL PUBLICATION

JAN. 14, 1952

50 CENTS



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The elaborate radar gear of the Northrop Scorpion F-89, the Air Force's top all-weather jet interceptor, makes it possible to shoot down enemy aircraft never even glimpsed.

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Playing an important part in the tracking operations are extremely sensitive rate gyros. Now being mass produced for manufacturers of radar search equipment, this small Honeywell gyro recognizes the rate of target motion and stabilizes the antenna "on target." It is light enough and compact enough to be mounted on the antenna. And another Honeywell gyro

development for radar tracking equipment — the "twin-spin" soon will be in production for non-antenna mounting.

Honeywell, one of the leading gyro manufacturers, specializes in this important field.

And Honeywell engineers will continue to experiment, improve and find new applications for gyroscopic controls. We plan to broaden our research in this and other fields of control — because *automatic control* is such an important part of aviation progress. And *automatic control* is Honeywell's business.

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4 hot ideas for fighting ice

The pipe that flies like a plane.
Goodrich's new Flying Boom for jet refueling (upper left) is actually flown into place by means of venturized sub-servos. To provide aero-servo control, these sub-servos had to be precision-aimed ice. B.F. Goodrich developed special electric rubber pads for the lead segments that supply power and strength.

Blister blankets keep new Arctic planes from freezing. Designed for Arctic use since week, Northrop's new C-123 (upper right) had no more ice protection at all than space. BFG electric rubber "blister" turned the trick for three para-transport aircraft, already here and air-seaiced. Because of the design feasibility of electric rubber, with man-

in-the-shape of these three pipe joints prevent no obstacles.

Keeps ice from choking jet's throat. Ice forming in the narrow "throat" of a jet engine intake could choke off the air supply, make the engine quit cold. This throat has been closed on North America's B-45 (lower left) with a special lining of BFG electric rubber around the cold.

Rubber makes gasoline avoid. To help Bf. Goodrich engineers design fuel supply for maximum efficiency, a hydrostatic test measures propeller load to an accuracy of one part in 100. But cold was complicating the job, causing false readings. BFG engineers developed the hydrostatic line in electric rubber, with man-

the oil fluid, over graduate. This heated line is now standard on TWA Constellation (lower right).

B.F. Goodrich electric rubber is tough, this rubber, with a core of resistance to heat, is the spot heat perfectly to excess. This heat was matched to the engine's regular wear and supply as the only true equipment required. Electric rubber can be made up to any size, any shape, any line part. For help with your problems write to The B.F. Goodrich Company, Aeronautical Division, Akron, Ohio.

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* Delta Air Lines inaugurated passenger service in 1957, flying single engine aircraft between cities from Dallas to Jackson (Miss.). At that time, maintenance costs were high, and many aircraft were down for maintenance on a daily basis. The Texaco Aircraft Engine Oil and Grease Lubrication System (OGL-1) then appeared, and 36 passengers could fly on better than 90% up-to-date aircraft. In 1958, Delta Air Lines planes have always been lubricated with Texaco.



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FOR THE AVIATION INDUSTRY



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NEWS DIGEST

DOMESTIC

DC-6A scheduled cargo service was slated to be inaugurated between New York and San Juan, Puerto Rico, by Pan American World Airways Jan. 30, using planes loaned from Pan Am. The new service links Europe to the U.S. to the Caribbean and to South America since it has an 8,000-mile range. DC-6A cargo rate quoted is \$1,000 per ton-mile, round trip. In January, Delta's green fleet began nonstop between DC-4s that apparently date 36 passengers could fly on better than 90% up-to-date aircraft. In 1958, Delta Air Lines planes have always been lubricated with Texaco.

Bombardier A-12 Conair, designed for ground support, has been flown by Canadian Vought-Douglas. In the Canadian F4D, the new A-12 has a single stage PAVW-K-2500 solid fuel rocket motor to project a jet from ground level and a number of unusual modifications. More than 12,000 Conair units of all models have been built since the first prototype.

Capt. John R. Pappas, Melville Corp., USN director of the Navy's newest nuclear weapons laboratory at NADC, Orlando, Fla., has retired from active duty. He had done much on development of pilot ejection seats, antiacceleration locks, G-racks and other aviation ordnance research.

CH-47 aircraft shipments, cost to 227,500 lb, last October increased in airframe weight. Total included 174 planes, valued at \$1.8 million. Bookings of 1,000 lb. and over, came to 700 at the end of the month. During October, 345 engine/transmission sets, 500-600 hp, were shipped. Aircraft plant manpower was 71,160 workers in engine plant, manhours 61,430.

Frederick A. W. Strober, 56, has been named western public relations director of Avco's Avco Aviations, Inc., in charge of the western office, as a member of the Los Angeles staff of IBM & Krasnow, Inc. Strober was former director of public relations for Bethlehem Steel Co., a post he has been active in California since 1954. He attended Kenyon College and Yale University, and is a chartered and elected engineer. He succeeds Gorham Lethal who resigned from the AIA public relations post.

GE Robbie Wilson, western editor for the New York World Trade, has joined Flying magazine as editor and publisher. World War I pilot, one of the organizers of the Civil Air Patrol, Wilson also helped establish the National Association of State Aviation Officials and the Aircraft Owners and

Fliers Association, his last title, president of the National Aeromodelers Assn.

FINANCIAL

National Airlines reports a net income of \$12,200 after taxes for last November, a 12.85% gain over the same period in 1958. Total operating revenues during November were \$12,262,450, a 15.11% gain over the same period in 1958. Convair has declared a 25-cent dividend to stockholders of record Jan. 14.

Rolair Aircraft Corp., Chula Vista, Calif., had an air sales of \$76,728,541 for the fiscal year ended July 31. Net profit was \$963,107. Equipment in use 3,800, breaking over \$100 million.

East, Inc., Carol Rapids, Mich., ended 1959 with shipments volume close to \$21 million, 21.63% increase over 1958. Current backlog is about \$40 million.

Afterburner Mfg. Co., Los Angeles, had gas turbine engine backlog boosted to nearly \$16 million when three additional \$1.5-million orders for dual power versions to the aircrafts on the Martin PIMA-1 Martin and Chance Vought F7U Cutlass.

Delta Air Lines reported 1959 operating profit estimated at \$4,585,000, more than double 1958, with net profit after taxes of \$1,976,000, compared with \$1,047,000 in 1958, or 53.5% increase compared to \$2.29.

INTERNATIONAL

Canadian government placed \$1,365,000 worth of aircraft parts and equipment contracts during the last two weeks in November, with largest single order going to de Havilland Aircraft at Canada, Ltd., Toronto, for engine and airframe spares amounting to \$1,128,000.

British Commonwealth, Pacific Airlines, partly owned by British, Australian and New Zealand governments, has received approval of all three to purchase 100 Convair jet airliners for their Pacific and Commonwealth routes to Australia and New Zealand with the U.S. and Canada. The BCPA planes will probably be Avro powered Series 11 Convair seating 44 and delivery will be 1964-1965. Order will come to \$8.4 million without spares or equipment.

Sud-Ouest Caravelle made its first flight at Toulouse, Jan. 14, 1960.

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justable limit switches, positive overtravel stops, adjustable position indicator, powerstatizer, and built-in radio noise filter are features of these Trim-Trols.

Models R-220 and R-174 are identical in performance, but differ in mounting arrangement.

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AVIATION CALENDAR

Jan. 16-18—States Panel Meeting, Hotel Statler, New York

Jan. 18-19—AIAA Rocket Society meeting at Square Signal Lab, Ft. Monmouth will speak on "Advances in Solid Propellant Rocket Propulsion," Engineering Society Auditorium, 39 W. 36th St., New York 1, 2 pm.

Jan. 21-25—American Institute of Electrical Engineers annual meeting, Hotel Statler, New York

Jan. 25-26—Meeting of Institute of the American Society Cleveland Metal Section, mfr., "Flight in Art." In T. L. Green, president of Sixth Avenue, Cleve-

land, 21st International Air Transport Area Technical Committee meeting, Valdosta

Jan. 22-23—AIAA Engine Technical Committee meeting, Hotel Roosevelt, N.Y. York, 7-10 pm.

Jan. 28-Feb. 1-20th Annual Meeting, the Institute of the Aeronautical Sciences, Astor Hotel, New York

Jan. 28-31—11th National Meeting of the American Meteorological Society, Roosevelt Hotel, New York

Feb. 7—Meeting of Society of Automotive Engineers, 14th I. Sekonda will speak on helicopter programs. Hotel Radisson, 5 Ave and 45 St, New York

Feb. 7-10—Annual meeting of International Society of Automotive Engineers, Hotel Roosevelt, New York

Feb. 14-15—AIAA National Aircraft Standards meeting, Hollywood Roosevelt, Hotel, Los Angeles

Mar. 1—Informational Meeting of Robin Engineers, Wabash Avenue Hotel & Grand Central Station, New York

Mar. 3-5—Annual Meeting of American Society for Testing Materials, apparatus on testing metal powders and metal powder products, Hotel Statler, Cleveland

Mar. 15—National Flight Propulsion Meeting, Institute of the Aeronautical Sciences, Cleveland, Ohio

Mar. 15-19—Second Mathematics Conference on Fluid Mechanics, to be held at Ohio State University

Mar. 27-31—American Society of Civil Engineers' technical exposition and annual meeting, Hotel Roosevelt, 5 Ave and 45 St, New York City, 7-10 pm.

Apr. 1-3—Annual Meeting of the American Association of Airport Executives, Ft. Worth

April 21-24—National Aerospace Meeting and Awards, Engineering Display, Society of Automotive Engineers, Hotel Statler, New York, New York

May 4-8—Fifth annual Wisconsin Aerospace Conference, Green Bay

June 8-12—Technical meeting of Institute of Naval Organization on Standardization, last will be American Standards Ass., Columbia University, New York

PICTURE CREDITS

11-CAB 14-USAF 15—Boeing, 18—North American Rockwell, 19—University Trade Press, 20—UPI, 21—WPA World, 44—Cessna, 45—

Washington Roundup

What's Ahead in Congress

As policy will be made about as political cross currents in this session of Congress.

Political lines aren't quite drawn on the issue, but generally that is where the competing forces stand now.

Truman supporters want to "go slow" on the air power bill. They are scared at its cost. This drives increasing emphasis on tactical and medium-range bombers as, like an language strategic air, in line with the Administration's foreign policy of "going it with neighbor."

House Appropriations Committee's Chairman Clancy set the tone. The Administration's defense budget will be "very tight." But Congress will crop it even closer.

Clancy's reasoning: "Last year we gave the Joint Chiefs of Staff everything they wanted. We had no other choice. The State was ready and we weren't ready. We had to vote a black defense check. This isn't the case this year. But States has passed the baton. From now on, time will be working in our favor. The military already has a lot more than they have been able to spend. We have the leisure now to take a look at the money and what can done with it."

Taff Foyes will try to outdo the Administration in lowering the ceiling on defense spending generally. They'll talk up strategic air power, though. It diverts them from their conviction that the U. S. should "go it alone" so as least be forced to do so.

Hayes' idea is to let the U. S. House Cabot Lodge, would seem defensible and fatter-wit cost and effects on civilian economic secondary consideration. Politics, however, is still a factor in air power. Priority for tactical air because of the present defense, but also a balancing of air defense and strategic air.

Outrage: After long hearings and much debate, Congress would probably, will approve somewhat less than the \$5 billion Truman defense plan for the coming year cutting slightly funds for Air Force and Naval air.

How Much Air Power?

• **What Size Air Force?** Third Congress should determine the "authentic" size of USAF, but probably not. The reason: Congressmen would open the floodgates for unnecessary cutbacks.

The last budget included a \$1.5 billion in USAF "not to exceed" funds. Department of Defense has asked for example, \$1.5 billion. House Armed Services Committee's Chairman Clark Vining has put forth legislation cutting a 16.5% reduction for USAF.

Vining has shown no inclination to set on the matter, though, once members of the committee measured they will want of a thorough airing of the USAF strategic and tactical air programs at hearings.

• **Minimizing Air Power.** Defense Department should will submit an order to report to Joint Congressional Atomic Energy Committee detailing plans to "minimize" the use of atomic weapons. That means minimizing air power. Air force will be the sole present operational vehicle for delivery of atomic attack.

If the Committee isn't satisfied with the report, there may be hearings to pressure defense into dismantling military structure to fit the weapon era. Navy would

welcome the opportunity to present its case. That article cross-bureau position is ideally adopted to deliver almost resolution at any point on the globe.

Toxes and Subsidies

• **Low Tax Element of Defense Plan.** Congress is to spell out stiff requirements for tax减免 on new defense projects and inheritance tax exemption than the present provision for quick fire arm amortization.

• **No More Taxes.** Administration's plan for a 100% in the corporate tax rate from 32 to 35% and a raise in the gasoline tax from two to three cents a gallon isn't likely to get through Congress.

• **Airmail Postal Increase.** Airlines will have to put up a stiff fight to ward off an increase in the postal rate of 10 cents an ounce. It is believed that Transair will attempt to increase its rates to cover out of Post Office's \$50-million yearly deficit. Even if it doesn't include a boost in airmail, there's reason to be a strong dose of caution for it.

• **Senate Separation from mail will probably will be taken up in House Interstate and Foreign Committee Committee in about a month.** There will be a drive to tighten the Senate-passed bill.

The issue: fight over the Johnson bill's provision setting the Universal Postal Union rate of \$2.86 a ton mile or the congressional rate for international carriers. Strictly factor does this violates a big shot of subsidy. The mail automated rates, as domestic rates, to reflect cost otherwise plus a reasonable profit. Postmaster General James DeSalvo sides with them.

Civil Air

• **Cut in Civil Air Funds.** Bits of Civil Aviation Adminstration gets up a fight, as funds will be sharply cut. Civil Aviation Board's budget will be a lesser target of Congressional economy.

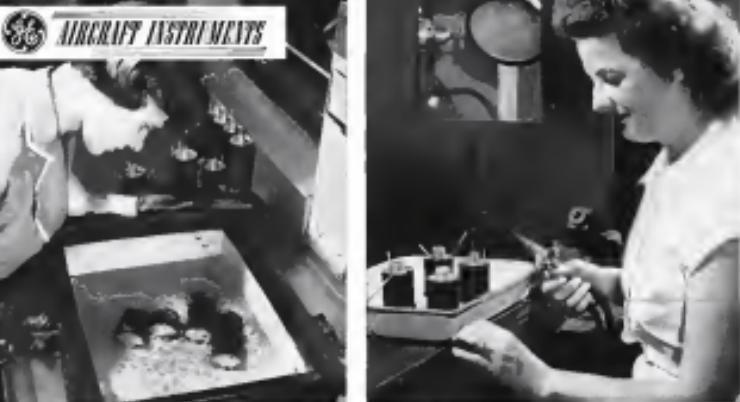
• **Airline Subsidies.** Post Office funds for airline subsidies will get rough treatment by appropriations committee. But the big fight of the session for subsidies won't come until next year after legislation requiring a separate appropriation is enacted.

• **Patent Testing Funds.** Outlook for government funds to launch the \$13 million authorized program for testing commercial prototypes is dim. Congressmen who have supported government funded testing of jets for commercial use are now feel that if the big airtanks can finance the development of a plane they can also finance its testing.

• **Jet Construction Subsidy.** Retiring will open a few weeks before House Interstate and Foreign Committee Committee on Sep. 1st. McCains proposal for a construction differential subsidy to insure that U. S. commercial aircraft can buy jet as cheaply as their foreign competitors. It's likely to get lost in committee.

Correction

In Washington Roundup of January 14, 1952, pp. 9, the U. S. target of productive capacity was stated as 18,000 planes and 15,000 jet engines a year. The statement should have read: "18,000 planes a year and 15,000 jet engines a month." —Katherine Johnson



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WHO'S WHERE

In the Front Office

Arthur F. Flood has been elected executive vice president of Fairchild Engine and Airplane Co. A native of New York, Mr. Flood has been with the firm since 1931, was made vice president-corporate in 1949, and became president in 1952.

E. T. Wood has been appointed manager of the aircraft division of Trans-Canada Air Lines. Formerly director of standards and supply control, Wood joined TCA in 1947 as manager in the vice pres. department.

E. V. Rippington, president and general manager of General Motors Board of Directors, has been named director of the Canadian subsidiary of the U. S. corporation. He is a vice president of Defense Production Division.

Changes

Edgar H. Atiles, formerly chief engineer for Avco Canada, has been given the newly-created post of technical director of the Avco division. Mr. Atiles, a native of Canada, has been with the company since 1946 and has been in the engineering and design division of the Canadian aircraft industry. For U. S. aircraft, a director of the company, has been given a newly created position that of gen. manager of the Avco division.

C. F. Gray has been designated assistant to the manager of finance for the Douglas Aircraft Co. Mr. C. F. Gray and David Doremus have been named to assist the company's domestic commercial sales manager. J. R. McGehee has been appointed chief project engineer on the DC-8 and DC-9, filling the vacuum created when J. B. Edwards left to become chief engineer for Pratt & Whitney.

M. A. Wachter has been named division manager manufacturing with Pacific Aerospace Corp., with D. R. Watson appointed as his assistant.

Bob Schaefer has been designated public relations director for the Pacific Bell Telephone Co., San Francisco.

W. T. W. Birkhead, formerly SNC representation in South America, has joined Armstrong Siddeley Motors to act as liaison with firms along this particular route.

Walter P. Double has been appointed to manage engineering for Parsons Corp.

Robert F. Hedges, formerly CMA's budget office, has been made economic analysis analyst in the Air Transport Area.

Donald B. Toland, previously with NASA for eight years, has been appointed to the engineering and maintenance staff of the Transport Area.

Frederick E. Johnson has joined Northwest Airlines' publicity department and Jerry Bresser is S. S. Pres. Vice Pres.

J. R. Wilkins has been promoted to superintendent of aircraft for All-American Airways and L. B. Sykes has been named assistant director of streams for VAA.

John S. Reed has been designated director of personnel for Pacific Northwest Air

INDUSTRY OBSERVER

► Decrease lateral stability ratio more than normal is said to be provided with no controllability loss, though the use of a more rigid side stability augmentation system is also said to be a factor. For increased lateral stability, the F-89 Seafarer alternative fighter, Devair uses a four-bladed air-intake fairing to mount side fins on the aircraft. An electric servo actuator adds to neutralize the side force. It is said to make possible coordinated turns at low turns without use of rudder pedals. However, full rudder is available for deliberate rotation. Device is considered an answer to the lateral stability known as Dutch Roll, without increasing wing load of the plane's tail. Result is a steady aerial platform for nodded or gun flying. Device already has been flight tested at Edwards AFB on the F-89.

► Convair's YB-40 recycling eight-engine development from the B-36 design and convertible to the XB-36 incorporates about the same amount of magnesium as used in the newest B-52, approximately 7,000 lb.

► Although the USAF insisted the McDonnell XF-85 parasite fighter project in the head section back, it has not entirely given up the concept of protecting its long-range bombers from enemy attack. One plan placing cutters around long range fast, heavy transport or logistics carrier planes, capable of carrying, launching and retrieving parasite fighters, in accompany bombers over enemy territory. The parasite would provide a screen for both the bombers and carriers.

► Our Air Force view on these German long-range planes which was brought to the U. S. after the end of World War II. The U. S. is much better off to have them than, even if there were never used, and than for those to have fallen into hands of the Russian aircraft industry. Russians get often German long-range planes, which they have been using.

► USAF researchers are now talking about heavy "long-range" planes to provide logistics support for all Air Force operations, those carrying every thing used by USAF in the field completely air transportable. Planes of 400,000-lb gross weight category capable of carrying 100,000 lb payload with range of approximately 3,500 mi and cruising at speeds much double those of today's bombers, transports or air planes. Presently the proposal by Convair for a recycling version of the XB-52, with eight turboprops or eight sub-jet engines, (Aviation Week, Nov. 5, 1951) would come close to this performance.

► Proposals of the Civil Aerodynamics Board to use an automatic power failure indicator with selective propeller feathering in the aircraft equivalent to present automatic feathering systems for transports has been endorsed by the Transport Airworthiness Requirements Committee of Aircraft Industries Association.

► Warning of existing relations between the Civil Aerodynamics Board and the U. S. aircraft industry is given in the disclaimer that several airframe companies have recommended to AIA that air force annual reduced CAA airworthiness markings be deleted until the Board takes official action to adopt the set of regulation principles for aircraft agreed to in its airframe and CAA technical representatives meeting last August.

► U. S. Coast Guard now has about 100 of the new larger Sikorsky S-55 rotor helicopters in service and is slated to get four more soon.

► Curtiss-Wright Corp.'s CW-40 helicopter has been moved from Dryden, Calif., August to the company's sprawling dry dock site at Caldwell, N. J., for final development and modification work, now almost finished. This is to effect a complete turnover of the craft from Douglas Helicopters, Inc., which designed and built the craft at the LZ-4 and first flew it Nov. 11, 1952, at Duxbury Airport. Curtiss-Wright purchased the craft in January, 1951. Until it was right tested in C. W. premises at Duxbury, then went into Dryden's shop for development changes. It was test flown again during November, and on Dec. 1, the liaison arrangement with Dryden was completed. Any further development work or modification will be Curtiss-Wright's independent effort. Dryden has announced

More Money Slated for Transport Safety

- Plans stress equipment, training, maintenance.
- But some suggestions may stir controversy.

By F. Lee Moore

Airlines and civil aeronautics officials will try to shift their 1952 budgets to put more emphasis on mandatory improvement of air transport safety. This is because the scheduled airline safety record of 1951 barely equaled 1950, and the non-scheduled lines had a stage and distance rate of C-46 accidents at the record, running unusually heavy air crash statistics.

Using 1950 crash rates, 1951 passenger fatalities at about 1.1 per 100 million miles for the scheduled lines (about the same as the year before) and 7.4 for the non-scheduled lines, the year before, despite a perfect 1951 record (that November).

► **1952 Safety Program.** Most plans of the attack, planned against airline schedules by airline safety equipment subcommittee, airline pilot training and selection, and airline and CAA maintenance checks.

Here's what parts of programs cited to Aviation Week by airline and civil aeronautics officials as deserving more money than have been promised. Indicated by airlines and CAA if they're to get an early implementation of safety.

► **Airlines.** Flight equipment. Torque meters and/or fuel flow meters reflect oil temperature gauge flight surfaces and (for some transports) reverse prop pitch and/or larger engine reverse speeds and/or improved landing devices like flaps.

► **Airlines maintenance.** Automatic pilot with auto approach, complex dust accumulation control, etc. In addition, the CAA is to make the airline measurement before CAA has installed necessary EME.

► **CAA maintenance.** Visual identification of magenta and mustard, now in development phase, terminal coverage (navigation) by both CAA and airlines; improved flight reference glide path; ILS now being installed gradually; radio traffic control in all



CAA CHAIRMAN Donald Nyrop (pointing) and William K. Anderson, director of CAA Bureau of Safety Investigation, inspect wreckage of C-46 near Little Valley, N. Y.

airways; better stops, at Washington, N. Y., and Boston, and improved approach light systems; landing gear CAA-Navy collaboration; weather radios; equipment and technique traffic control data compilation and display equipment and techniques.

► **Airline pilot training.** Airlines, CAA, and the pilots themselves are re-explaining need to follow approved standard procedures, auto-out play around in a standard cockpit, and answer to a standard committee to evaluate when emergency conditions arise. They say Airlines and CAA are encouraging pilot check programs.

► **Maintenance.** CAA is intensifying maintenance and operations inspection of airlines especially non-scheduled. And CAA is expected soon to have the local stage rate load of the C-46 for passenger flights.

The above fully lists the less controversial programs as to need. The issue remains in debate.

Then here are some over-controversial suggestions recommended by Avia-

AVIATION WEEK, January 14, 1952

tionists. But the pilots point out that in about every angle comes the "over" reached from independent indications. The standards pull up on one side, and pull down on another. Better regulation can simplify the pilot's job, the pilots say.

Pilots say they are always going to be human and probably will run into potentially fatal difficulties at least every million miles.

► **Some Answers.** Equipment suggestion in the broadest sense, toward safety flying, this point out.

Pilot's plan is usually summarized in more airline and CAA money and management attention on improving aircraft, smoothing out-of-bounds and/or equipment development, maintenance and control, cockpit and designing for safe equipment and standards equipment in case of failure of the primary equipment.

Some plan in human radio in the No. 1 development program needed.

And there are two big obstacles to what they consider necessary budget increases for safety improvement of air borne and ground equipment: airlines, now that they are making money, are putting it into better new planes to make more money; local congressional committees appear to oppose money spent for maintenance, but not on major improvements.

► **Non-scheduled Airlines.** Changes—The non-scheduled especially C-46 operators are now suffering some loss of business, directly attributable to the public, given that year end accident records. Hey is why.

The Dec. 16 non-scheduled C-46 crash at Elizabeth, N. J., killed 56, second worst U. S. airline crash in history, the Dec. 29 non-scheduled C-46 crash at Little Valley killed 26, with 34 survivors made due to circumstances, both were non-scheduled C-46s, both occurred in a two-week period around the Christmas holidays. Both were made due to circumstances, both of them with C-46s, occurred in the November December period.

Thus all crash while CAA was considering reducing the allowable gross load of the C-46, as CAA Chairman Donald Nyrop explained at a press conference at the Little Valley, N. Y., crash scene. Nyrop made his unprecedented flight to the scene from Washington while bodies were being recovered and all 14 survivors were still in the local hospital.

► **Trouble Ahead.** The non-scheduled C-46 operators are expected to run into some problems when CAA comes along with its proposed stage rate load on C-46 passenger flights. This would cut payload of the plane and/or force more fueling stops en route.

Meanwhile, CAA Safety Director

Fatal Airline Crashes in 1951

list one less fatal LMF trip, and UAL changed cockpit radio equipment to eliminate noise from LMF.

► **Onboard.** Calif., flew into ground, scheduled and charter line Air Angeles Airlines, routine flight but with pilot assignment missing as rated. Jan. 2, 1951, cockpit 2 crew, radio control lost for自动驾驶 mode (radio link), CAA safety director.

► **Offboard.** CAA clearance, over land, landing, scheduled, Northwest Airlines, passenger flight, Jan. 14, 1951, cockpit 2 crew, radio control lost for自动驾驶 mode (radio link), CAA safety director.

► **Onboard.** Calif., flight, over ocean, landing, scheduled, United Air Lines, passenger flight, Aug. 24, 1951, cockpit 2 crew and 44 passengers, unhandled ground approach landing clearance (overflew).

United handled pilot says on account of noise to start the automated procedure.

► **Onboard.** Calif., fell to ground, scheduled, regular, Pan American, flight, Nov. 14, 1951, cockpit 2 crew, fatigue failure of landing gear, loss of auto safety lock (ALS), Stephen Murphy, longer than 3000 ft.

► **Onboard.** Pan American, flight, over land, scheduled, United Air Lines, routine flight, Sept. 2, 1951, cockpit 2 crew, radio control lost for自动驾驶 mode (radio link).

► **Onboard.** Calif., flight, over ocean, approaching, Pan American, flight, Nov. 1, 1951, cockpit 2 crew, fatigue failure of landing gear, loss of auto safety lock (ALS), Stephen Murphy, longer than 3000 ft.

► **Onboard.** Amer. Air, flight, lost control on approach, crashed, Transocean Air Lines, passenger flight, Nov. 8, 1951, cockpit 2 crew, but became effective after takeoff.

► **Onboard.** Amer. Air, flight, en route, lost control, crashed, Transocean Air Lines, passenger flight, Nov. 16, 1951, cockpit 2 crew, but became effective after takeoff.

► **Onboard.** Amer. Air, flight, en route, lost control, crashed, Transocean Air Lines, passenger flight, Nov. 16, 1951, cockpit 2 crew, but became effective after takeoff.

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CAA further outlined the severity of C-46 inspections by CAA inspectors.

► **Onboard.** Alaska, non-scheduled, charter line, American Air Lines, Navy cargo and passengers, en route, Dec. 11, 1951, cockpit 2 crew and 2 passengers, unhandled radio range (radio link).

► **Onboard.** Amer. Air, flight, en route, unhandled radio range (radio link).

AVIATION WEEK, January 14, 1952

Ernest Henley has opened a drive to capture unused maintenance and operation procedures.

He started the up-kept safety checkups with an "urgent" New Year's Eve telegram to all CAA regional administrators. That ordered them to put all available inspection on all-aircraft C-46 operations and maintenance procedures and report back within five days. That was to be followed by a concerned follow-up drive on all aircraft operations.

At the end of the three days, regional reports returned showed that from a total of 252 individual plane inspections, four "violations" of safety regulations were found along with 150 so-called "discrepancies," meaning no perfect condition of a generally sound nature. These figures are not complete, however, as the Texas region reported "numerous" discrepancies without a count and the California region reported "numerous" discrepancies without summarizing them.

► **No Overhunting**—There were no general grounding actions reported, indicating corrective action apparently

was taken promptly in all cases listed. However, it appears that none of the three total C-46 models in 1951 is attributable to gross load.

Again, no specific fire burning through the wing span was the apparent cause of the Edwards crash. Flying below maximum altitude in bad weather apparently caused the Little Valley crash. CAA investigators say the cause of the Edwards crash appears to have resulted from loss of radio and radio contact during instrument approach among the mountains.

► **Little Valley**—Com-Air, as the 1951 Aviation Week analysis of the Little Valley crash concluded, the following probable cause, confirmed by statistical conversations with CAA investigators:

Flight originated in Miami. It stopped at Pittsburgh and ended in a cross country and made passengers from there bound for Buffalo to start a new flight back to Miami. En route, it was about altitude between Pittsburgh and Buffalo and was supposed to be 1,000 ft. The pilot flew it right down to the ground.

So investigators now believe this was another weather and navigation crash, not a mechanical failure.

Flight conditions reported total 4,000 to 13,000 ft.

So he apparently decided to fly low instead of flying back—possibly because he cannot see only passengers but the flight crew scheduled to fly a Boeing Model 307. Trying to fly smoothly when clouds were down to the horizon had the same fatal result in the Little Valley case as in the Edwards case, the same Boeing crash of a Southeast DC-4 and Grumman crash of a United DC-6 also during 1951.

On the scene, it at first appeared that one engine might have been dead, because its prop blades were bent backward, while the other engine's prop was bent forward on impact as prop developing power heads toward the high rpm rate (relative with the ground). ► **No Mechanical Failure**—Inspection of the prop gears and engine indicated both engines were developing power and that one engine was probably failed to contact with the trees around because it lost contact with the ground.

So investigators now believe this was another weather and navigation crash, not a mechanical failure.



AF Takes Wraps Off Boeing XB-52

About a first official photograph released by the Defense Dept. of the big strategic Boeing Stratofortress heavy bomber, Boeing was consistent with taking off the plane's camouflage to permit engine tests.

In keeping with the Air Force's Secretaries' letter to Congress, Air Force Secretary Thomas K. White's request that an individual be allowed to inspect the Department of Defense's heavy bomber, Boeing's XB-52, was granted. The letter, dated January 10, 1952, was the latest possible, and it is estimated that it would be of value in air shows. "We are making the photographs available now, as the engine can be held longer than the aircraft can be taken apart,"

"To protect the security of other information concerning the bomber, it is requested that news photographers and the public cooperate with the Air Force by refraining from taking any other photographs. We will make every effort to maintain the present physical security of this aircraft. The cooperation of the news media since the in-

cident, since it was rolled out from the Boeing factory on Nov. 29, has been splendid in that connection. We feel sure we will continue to receive such understanding and cooperation in the interest of making the photographs by a potential means of identification by a potential enemy as difficult as possible."

The Boeing XB-52 has been previously announced as a long-range jet bomber equipped with eight J-57 turbojet engines made by Pratt & Whitney. No further details on the aircraft are being disclosed. □

Since the above release, these additional XB-52 facts have been disclosed by the Air Force, including the cost of the aircraft by subcontracting from taking any other photographs. We will make every effort to maintain the present physical security of this aircraft. The cooperation of the news media since the in-

Boeing Shuffle

► **W. E. Beall becomes top operating executive.**

► **Closer direction between Seattle, Wichita operations.**

A reshuffling of top management has been set at Wichita, Kans., as assistant vice president and general operating executive of the Boeing Airplane Co. has been named to President William M. Allen and the Boeing Board of Directors.

The move came shortly after the company had announced that its backlog is unlikely to rise over total \$1.25 billion, one of the largest in the industry.

Beall will have general supervision of engineering, manufacturing, cost control, administration, sales and other functions at Seattle and Wichita. He has been here a key man in the Boeing organization as vice president, engineering.

► **W. R. Ruskell**—Engineering President Allen said that the new Beall assignment and other realignment of Boeing management was implemented immediately to "significantly bring about greater cooperation and greater efficiency" between Seattle and Wichita divisions. He announced that all functional division heads at Seattle as a part of this new program, would receive policy direction of similar functions at Wichita, if they had not already done so.

The new group consolidation of responsibility at Seattle was preceded last year by consolidations at the Seattle and Wichita engineering departments under E. G. Wilts, vice president.

Other functional heads at Seattle who are assuming primary direction of Wichita's work, include F. P. Endriss, vice president, manufacturing; J. D. Fanning, vice president, cost control; A. F. Logue, vice president, industrial relations; H. E. Bowman, attorney; George Seibert, director of spaces; E. F. Kiani, quality control manager; and R. W. Mansfield, director of public relations and advertising.

Fredrick B. Coffin, vice president, sales, and J. M. Morrissey, in charge of sales and product division, do an basic marketing department at Wichita.

► **Reports to Beall**—Ed Schaefer, vice president, general manager of the Wichita division, will report to Beall, however, as will the offices of Boeing Washington and Dayton representative firms.



Wellbend E. Beall

Other changes in the Boeing organization: C. B. Crater is named vice president manufacturing, Wichita, in place of his former post of vice president, operations Seattle.

A. W. Schupp, Wichita factory manager, continues in that post, reporting to Crater.

C. G. Jensen has been named vice president, design engineer, Wichita, and the assistant secretary and assistant treasurer for the company. He formerly was vice president, assistant general manager Wichita. He will be responsible for financial and contract administration at Wichita.

► **Clyde Starnes**, former assistant manager, Wichita, is transferred to Seattle to vice president controller, Seattle.

► **B. T. Mueller**—Jack Clark, former assistant to factory manager, Wichita, was named manufacturing cost control manager of B-57 modification unit, transferred to Grand Central Aircraft, Chicago, Ill., Aug. 1.

N. J. Shandell was promoted from assistant chief engineer to chief engineer, Wichita.

President Allen reported that about 625 of Boeing's production is assigned to subcontractors.

Net earnings at the end of the first quarter were reported as \$4,853,194, as compared to \$2,110,252 for the first three quarters of 1950. Reduction was attributed to lower profit as government business, higher revenue and increased profit from, and to changing the largest airplane contract to a type which does not show earnings until the plane is delivered.

Engineering costs at Seattle have risen to 18,000 and at Wichita to 25,000, as compared to per-Korea figures of 11,000 and less than 10,000, respectively. World War II peak Boeing capacity was 75,000.

► **Expansion Plans**—Major Boeing expansion programs at Seattle include a new engineering and office building, flight test hangar and tooling construction building, all paid for by the company, and government-financed construction of a manufacturing and warehouse building and a kitchen shop and more new machine tools.

Seven major construction projects at Wichita include a new light test hangar big enough to house 12 B-47 bombers, a new electrical building, increased power and trackage, and doorless warehouse.

Boeing programs include quantity production of B-47 jet aircraft (medium bombers), KC-97, Stratofighter transport aircraft, TB-50 Superfortress bomber aircraft, guided missile development programs, limited production of a small jet fighter for the Navy, production and sales of electronic sensing equipment, as well as involving sparkling and power expansion programs.

New Copter Blade De-icers Announced

New electric de-icing for helicopter rotor blades, using a system similar to the aircraft de-icing boots sometimes used on aircraft propellers, has been developed and tested by Bell Aircraft Corp. under Navy contract.

William Kellie, Bell chief helicopter engineer, and the system can move this. It de-icing rates in 30 days at the altitude of Mt. Washington, N. H., with uniform success. The system uses Neoprene rubber strips with electric heating wire embedded in the strips. These are stretched along the entire length of the main rotor blades and over about one-third of the blade.

The total area in temperature ranging from 40° F. to -14° F. on each of 30 strips and in de-icing rates in 30 days at the altitude of Mt. Washington, N. H., with uniform success. The system uses Neoprene rubber strips with electric heating wire embedded in the strips. These are stretched along the entire length of the main rotor blades and over about one-third of the blade.

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Management Key to Martin Money

Sweeping financial plan involves RFC aid and higher 4-6-4 price; but it all depends on change in top officials.

By Alexander McBurney

Search for new top management for the Glenn L. Martin Co. was going on last week inside and outside the aircraft industry in the necessary prerequisite to putting into effect the new \$32-million financing program for the Baltimore aircraft company. It was understood that no new management would be a condition of the new financing plan.

With capable aircraft management talent already spread very thin by expanding program, some industry sources forecast that the new top man might well be picked from an allied industry, such as a transportation equipment manufacturer.

If this is actually accomplished, it could mean that C. C. Fenton, current president, would continue with the company for a transition period, or until the new management was ready to act, by naming an own man. There was other speculation that Fenton might step off at Martin's production base, but with a new management in executive handling, the transition appears feasible. It was reported as a top problem to govern in the aviation industry.

► Financing Plans—Details of the Martin financing program, disclosed by Navy Secretary Tom Kuchel, indicate that as much as \$32 million additional to aggregate financing is scheduled. This is subject to Martin stockholders' consent.

Kuchel's announcement and the new plan had the full endorsement of Air Force Secretary Thomas K. Feltner.

Analysis of the financing program shows that it is divided into two big items: Martin's current financial situation and the new financing.

► 4-6-4 Agreement—Mid-December deposit of \$100 million on the 4-6-4 aircraft ordered by Eastern Air Lines and the 40 ordered by TWA and an option to additional 4-6-4s is a part of the agreement, Kuchel said. The model's fate involves an increase of option until \$15,000 per plane in the price to be paid by the airline.

Original price was reported to be approximately \$745,000 per plane. The increase would mean in additional total payment of over \$2.5 million by the two airlines to Martin. Kuchel said that the two airlines had agreed to the Air Force and that the two airlines had cooperated in the general financing plan.

► 24-2A Funds—Release by RFC of its claim on net proceeds from the sale of Martin 202A transports which have

been estimated at \$45 million is part of the plan.

RFC had a claim on the 202A sales proceeds in additional conflict with its loan of \$45 million to Martin, second priority by a first mortgage on the Martin plant and facilities. These other assets are currently being evaluated, and it is estimated that a value ranging from \$15 million and \$20 million are being realized through \$50 million additional of federal tax credits.

They are considered ample strength for the loan, without the additional 202A conflict. The 3-6-3s are still under lease to TWA, pending its placement as 4-6-4s, and are to be turned back to Martin as required, or to other purchasers. The \$4.5 million estimate for their present value is a tentative figure only and final price could be more or less.

► V-Loans—Increased-Budget single contributions to the V-Loans Martin division in the plan is an estimate in V-Loans' finance department, ranging from the current \$15.5 million to \$22.5 million, a stepup of \$1.5 million. This is considered ample, Kuchel said, to finance the present defense contract backlog, reported "at excess of \$400 million."

Books which have handled Martin's earlier V-Loans are Mellon National Bank, Trust Co., Pittsburgh, Chase National Bank, New York, and the Baltimore National Bank. It is probable these banks will handle the new loans as well.

► Defense Credit—Financement of a \$7.5 million credit source for Martin is programmed under Section 367 of

the Defense Production Act of 1948, with RFC providing the credit. The action authorizes such credit to companies participating in defense programs when it is not available otherwise.

► Private Financing—New private capital provided by arrangement through South Bankey & Co., of New York, is expected to provide the balance of the \$32 million new financing, which figures out to approximately \$6.5 million. Earlier it had been reported that the South Bankey share of the financing would be \$1 million.

Unofficial reports are that the financing will include Lawrence S. Rockefeller, who already has substantial station interests in Eastern Air Lines, McDonnell Aircraft Corp., Pan Am Helicopter Corp. and Republic Metals Inc. These were some specific qualifications that the new Martin management might be drawn from some of these other aviation companies.

Glenn L. Martin, founder and chairman of the board of the Martin company, and Smith Davis are expected to be principal figures, along with the selected members, in forming the new management organization. It was indicated that the new management will have to be acceptable to RFC and Office of Defense Mobilization as well as to the military services.

There were reports that Mr. Martin, who owns 26% of the currently outstanding stock of the company, would take his active voice in the management under the new setup this fall. It is assumed that the new private financing will be handled through more or additional company stock.

► Loss—\$15 Million—Martin demands difficulties are attributable largely to losses suffered in its converted 1949-50 production program going back to its first postwar transport, the Martin 202, as well as its current production program on the success 4-6-4.

It was previously reported (Aviation Week Dec. 10, p. 14) that Martin losses amounted to \$18 million for the first postwar. A reduction for the company's troubles this largely to increased costs of manpower and materials and increasing production rates following the Korean crisis, which were not fully reflected in the company's final price of the aircraft was set.

Martin's current military backlog includes orders for the USAF's S-57A Cutlass light bombers, guided missiles including the Matador, Viking and others, Navy flying boat and patrol bomber contracts, large subcontractors for production of assemblies of Grumman jet fighters, and considerable electronic warfare.

Under present plans, the President will submit the budget to Congress Jan. 23.

1953 Budget

President Truman will request a \$52-billion defense budget for the 1953 fiscal year, starting July 1, which includes \$23.7 billion to the Air Force, the largest contribution to date, and achievement of a 143-wing USAF strength by mid-1954, according to military sources.

Air is allocated \$14.7 billion and the Navy \$13.6 billion, it was said. The remainder funding up the \$52 billion is for the Office of the Secretary of Defense and the various military services.

Under present plans, the President will submit the budget to Congress Jan. 23.

Get in the Scrap—Ties Torn in Defense

AVIATION WEEK, JANUARY 14, 1952



UNITED STATES



U. S. AIR FORCE



U. S. NAVY



U. S. MARINE CORPS



BRITISH



FRANCE



BRITISH COMMONWEALTH



CANADA



ITALY



NORWAY



NETHERLANDS



AUSTRALIA



BELGIUM



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Gilfillan Radar Goes Global

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by the United States and by ten United Nations Allies



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AERONAUTICAL ENGINEERING



Fiat Discloses Details of Turbojet G.80

- First Italian turbojet aircraft starts flight tests with de Havilland Goblin 33 centrifugal engine.
- Succeeding prototypes of the trainer-fighter will carry Rolls-Royce Nene and D.H. Ghost powerplants.

Flight tests have begun for Italy's first turbojet aircraft, the Fiat G.80 trainer-fighter. Almost 18 months after first announcement (AVIATION WEEK July 31, 1958, p. 28), the plane flew at Formia in southern Italy early in December. Vittorio Caccia, Fiat pilot, was at the controls for the first flight.

This first version of the G.80 is powered by a British de Havilland Goblin 33 centrifugal turbojet. It will be replaced by a second prototype with a Rolls-Royce Nene. And these will be followed by a third using the de Havilland Ghost engine.

The design of the G.80, which marks a resurgence in Italy's highly competitive aircraft industry, is the work of Prof. Giobert of Fiat. And the development of the aircraft must have been quite a task for the Italians, located as they were by lack of research facilities.

• **Stability.**—Perhaps the best U. S. plane to use as a comparison for the G.80 is Lockheed's T-33 Shooting Star.

The surfaces are similar in planform, dimensions and weight, but not in appearance.

Dimensionally, the G.80 stands up this way: Span, 35 ft., length, 49 ft. 6 in.; wing area, 279 sq. ft. Its empty

weight is 13,930 lb., and gross is 21,910 lb.

Maximum speed of the trainer is 390 mph at sea level. With flaps, it stalls at 105 mph on the deck. Flying weight is 41,080 lb., and the takeoff run is 2,100 ft.

As part of the Fiat plan for getting maximum performance out of the craft, wing profile and airframe tolerances of 1/16 in. and 1/2 in. are respectively given. The airframe can be easily shaved under minimum weight of 9,000 lb., and roughness under 31 mm.

The wing is clinched with 31 mm. bolt-holes. Skins are fastened with an external bolt strip fastened with countersunk rivets.

• **Stall.**—Aerodynamic phenomena are accounted for on the G.80 design by making wing and tail surfaces very stiff in torsion. Rigid transmissions replace flexible cable whenever possible in the plane.

Adequate rudder toe-in is thus first essential to initial limitation of balance weight. This is not possible. Consequently, wing leading and main gear fairings are fastened to the surface through a network of lenses.

High strength fibers of an impregnated type were used in the construction of the G.80. New strip and impregnated

tubing is to be used. Fiat is keenly interested in materials. Checking the finished parts involved an inspection with fluorescence in black light, scale to the Zyglo process.

• **Structure.**—The monocoque fuselage of the craft is divided into three sections. The nose part includes the cockpit, the nose wheel and gear and the front fairing. The middle section is the forward heart and tail section in the wing carry-over, in addition to carrying the main fuel tanks and bearing the engine. The tail section contains engine tailpipe and end of course, bolts on the tail surfaces.

The nose section is held on with a Frabrolastic series boltform which permits quick removal. It can be replaced with other nuts equipped for different heads.

The forward position is for the jet engine, the rear one for the propeller. Both are held in place by bolts counteracted for day and night flying. Camups are preferable and seem an Merlin Hitler operation types. The cockpit is pressurized and sealed with an adjustable tailleur joint.

The wing panels are center and two outer—six conventional bays containing three. Metal-covered airfoils and split flaps are fitted. The panels can be replaced with sections of increased span to boost wing area and support endurance.

• **Equipment.**—Six fuel tanks carry the fuel supply two in the fuselage and two on each side in the outer panels. Nylon-rubber tanks also have been designed for increased fuel capacity.

4). And weight limits can be fitted. Electrical equipment is all die-samped in aluminum and two series-connected batteries. Two external plug connectors are provided, one for testing internal circuitry and the other for starting the jet engine.

Battery is a VARTA 1100-ampere-hour with 10 cells.

The cockpit is a Concorde-type, using mostly bonded. It is expected to cost either \$100,000 to \$150,000.

During the flight test period, the aircraft contains a photograph installation. In addition, a recording device, aircraft pilot's comments.

BEA Outlines Specs For Passenger Copilot

A 45 passenger helicopter is the future answer to the short-haul problem of British European Airways Corp. That is the implication of the requirements recently issued by BEA in a type specification now ready for circulation throughout the British aircraft industry.

It goes without the design should be capable of continuous operation over short distances of 50 to 250 miles, with a 45 minute turn-around.

BEA's conclusions were reached after

four years of experience with its experimental helicopter test, and as a result of engineering, economic and legal studies. Internal costs within the British Isles and some overseas Client states, costs were considered on the studies.

Such a large helicopter would probably be described first as a 30 passenger jet to a distance of 115 miles with full fuel and one hour reserve. But the aircraft should be designed with endurance capacity to take 45 passengers and fuel for a 230-mile flight at some later time.

With a cockpit of this size, BEA says performance estimates indicate comparative costs, associated with fueling plants, will be more than double that of the number of passengers, stage length and weight-engine requirements. BEA also says it would like to have:

- Crossing of 150 miles or better
- One-engine-out performance
- Easy handling even in the most adverse
- Design and antiicing comparable to Concorde, from nose to tail
- Landing field of 400-ft diameter with surrounding obstruction slope of one in three.

After design studies have been made, BEA hopes to order a number of prototype craft of different designs for evaluation.

Nylon Bearings Show Long Life

Experimental proving of nylon bearing blocks for engine applications in short proving ground experiments, Tidaf of Delft, Holland, has been functioning these withstood four or five hours on a take to the nearest hundredth of a radio meter, and has reported very low friction errors.

The nylon bearings are said to last 4 to 5 times longer than bronze bearing blocks and reduce a pressure of one ton per square centimeter, with almost no lubrication required.

The product is being sold under the trade name of Polim.

Laminating Resin Takes High Heat

A new high-strength at high-heat polyester laminating resin is under test at Wright Air Development Center for use in manufacture of fire planes and guided missiles.

Developers of the material, reported to be a polyester product, a high-40-4007, in United States Rubber Co's Naugahyde Chemicals division.

Laminating work with the resin and glass fibers are to be the company to retain good flexural strength—45-67,000

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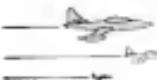
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UTICA HELPS



BY FORGING EXTRA "FIGHT" INTO TURBINE BLADES

Here's the turbine assembly of Pratt & Whitney Aircraft's great J-48 Turbo-Wasp—first jet engine to attain official rating for 1,000-hour overheat.

Take a particular look at the turbine blades, photographed after 300 hours of actual operation. Besides contributing to the general service dependability of the J-48, they have another remarkable story all their own.

Combat pilots in Korea report that these blades, oper-



ating at 11,500 rpm and at extremely high temperatures, have taken damage from bullets and rocks without serious impairment of engine performance—and brought plane and pilot safely back to base.

The forging of rugged blades like these is the type of work we're doing here at Utica. We're proud that Utica was one of the earliest primary suppliers of turbine blades to Pratt & Whitney Aircraft for the Turbo-Wasp.



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BUSINESS
A PLEASURE!



most credit company which handles commercial and industrial credit needs, large farms and the like.

He had his own bath fly . . . was that Cessna 170 comfortable for personal contact with distant prospects, representing and showing property from the air, taking color aerial photos of choice areas and for inspection of property and the like. Paul feels he paid for the 170 three or four times over—indeed he would not have travelled without the plane.

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in comfort over high obstacles
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pa—when exposed for as long as 208 hr at 300°F, and over 2000 hrs when exposed to 200°F at 300°F. Most materials are attributed to minor portions of total exposure.

Modeled as Vultee X-1047, the plane initially will be available for military applications, the company reports, but production capacity is being expanded to take care of civilian, electric, tourism, solar and other applications.

Busy Year Forecast At Wright Air Center

Dayton—The year 1952 promises even more activity than last year 1951 brought the 32,000th engine at the Wright Air Development Center here.

Engineers, scientists, pilots and specialized laboratory technicians have on tap about 1,300 individual projects, reflecting advances in virtually every phase of developing a complete Air Force.

A rough grouping of programs would include: surface, engine, propeller, guided missiles and electronics in addition to supporting programs. High lights of this include:

- **Aircraft.** The aircraft for flight tests in the Convair B-58, a stripped version of the B-56. Further information on aerodynamics is anticipated from extensive tests of the X-5 and the XF-93 featuring, respectively, the variable sweepback wing and the delta wing configuration.

- **Engines.** NEPA ("Nuclear Energy for the Propulsion of Aircraft") is the big word in this field. It could revolutionize aircraft thinking on plane power plants. An Avco has signed a development contract with Consolidated Vultee for study and design of an aircraft to be powered by NEPA jet engines. A modified fat tailoring as a means of cutting performance is known.

- **Propellers.** Extensive studies are on the frontiers for propeller capable of supersonic speeds. This amounts to a revolution for propellers, which were compared to the "obscure" example at the outset of jet propulsion. New 1952 test rigs point up considerable more work on the helixing phase of this activity.

- **Guided Missiles.** After one brief public display, the Marine Matador Air Force put the first guided missile stage. Data released by WADC from preceding ground tests now rank as closer approximations to "just better" of late.

- **Electronics.** This is the most active of all the major fields. Virtually every electronic device is being improved and new ones are being added. The goal in this activity is flight in all



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When you acquire gear having either very close or wide tolerances, consult Vultee. Their "Manufacturing Windows" is your assurance that all gears will be delivered as specified, and generally at lower cost.

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possible weather conditions, as well as overall improvement of operational efficiencies and systems.

In-flight refueling will be given much attention, following reported tests which revealed the value of this contribution to long-range operations. Data already compiled in connection with the B-47 (being refueled from KC-97) indicates technique can be adapted to any type of aircraft.

Convalescent stress also will be placed on cargo parachute dropping techniques. Also a perfection of cargo craft to a point where complete loads can be supplied by air with either capacity of dropping 10 tons equipment without spreading it all over the load scope.

Organizationally, there is an indication WADC activities may be located a bit closer to the parent organization, Air Research and Development Command, by moving the latter to Wright-Patterson AFB from Baltimore. The present arrangement has been a source of expensive concern to Air Force contractors who need to do business with WADC project managers at Dayton and ARDC bases in Baltimore.

Seven wings now partially comprise WADC operations. All Aerospace Electronics, Weapons Systems, Weapons Components, Armaments, Research, Flight Test, Material and Engineering Subdivisions.



Circle Cutter Fits on Bandsaw

A cutting attachment for bandsaws is doing that cuts at Texas Engineering and Manufacturing Co. Inc.

Use of the device has effected an average reduction of about 90% in manhours required to produce steel and other wood items having circular or more curved dimensions. As many as 200



Lockheed's new Super Constellation features improved cockpit vision with Pittsburgh Flexseal Safety Glass

Newest addition to Lockheed's famous family of Constellations is this giant 3049 Super Constellation. Pilot vision comes in for careful attention in designing the plane, and every possible step was taken to assure the best visibility in all directions under every flying condition.

The seven apertures in the cockpit are all glazed with the Pittsburgh Flexseal Safety Glass. This glass and plane laminations has been found ideal for the high-speed, high-altitude operations typical of the Constellation. It is easily-repaired with narrow ports that provide the least possible obstruction to vision and it is fire-resistant.

The three forward glass areas in the cockpit make use of electrically-heated Pittsburgh NE-5A Glass. This special type of Flexseal was installed after exhaustive tests of its heating and preventing cycles in Lockheed laboratories.

This the 18-passenger Super Constellation takes its place alongside many other commercial and military planes equipped with Safety Glass by Pittsburgh Manufacturers constantly bring their glazing problems to Pittsburgh, knowing they'll receive prompt, engineering assistance along with Safety Glass specifically designed for the job it must perform.

We invite you to submit your Safety Glass and glazing problems to Pittsburgh engineers; they'll receive the most careful attention. Pittsburgh Plate Glass Company, Room 2033-2, Gulf Building, Pittsburgh 19, Pa.

Right view of the Lockheed 3049 Super Constellation, the newest member of the famous family of Constellations that have served the world's major air lines. All windows in the cockpit are made of Pittsburgh Flexseal Safety Glass.



A close-up view of the side windows of the Super Constellation's cockpit. Note the unbroken glass installed by an informed glazing method that prevents any sort of accidentally broken glass.



Here three bowed glass windows are electrically heated with Glass to assure the best vision under every flying condition.



PAINTS • GLASS • CHEMICALS • BRUSHES • PLASTICS

PITTSBURGH PLATE GLASS COMPANY

IN THE NEWS

SERVICE



Getting top vibration from jet engines requires many techniques. Here are a few of the means used by General Electric to help the Air Force get maximum use from its J47 engines.

To provide immediate service for General Electric equipment, more than 30 G-E Service Shops are placed strategically around the country. Four of these shops are currently handling aircraft gas turbine work, more can be adopted as required. Skilled technicians provide rapid and complete repair and overhaul facilities.



At an Air Force base, a G-E representative shows Air Force personnel some fine points of jet engine servicing. To keep up this field training, formal G-E jet engine schools have been functioning since 1942. Courses are now presented in fundamentals, overhaul, flight test engineering, and live maintenance.



G-E service follows G-E equipment around the globe. Here, "Tech men" from General Electric and North American Aviation Inc. in Kansas discuss combat performance of the G-E-powered, North American-built F-86 Sabre. G-E aviation field service representatives cover the vital spots in the world, are always available.

For quality products and dependable service, call on the company that pioneered the aircraft gas turbine industry. Telephone your General Electric aviation specialist or write General Electric Company, Schenectady 5, New York.

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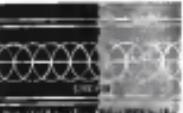
FARMINGDALE, NEW YORK

DYKEM STEEL BLUE STOPS LOSSES

making dies and templates

Steelly looks on right of this layout, ready for the hopper in a live situation. The dark blue background makes the vertical layout lines stand out in sharp relief, and at the same time increase visual alertness, increase efficiency and accuracy.

Write for full information



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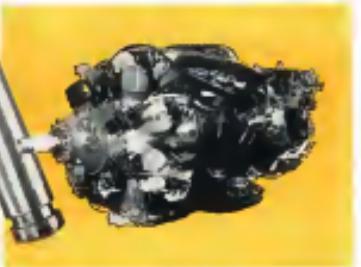
T.P.M.

..biggest aircraft valve news in 15 years

To give more engine-life from valves, Thompson developed T.P.M. — an improved alloy that enables greater corrosion resistance and higher strength at valve-operating temperatures.

T.P.M. is the first major improvement in aircraft valve materials in 15 years. It is made from a combination of Thompson's pioneering in valve development and Thompson's experience with metals operating at high temperatures.

T.P.M. valves coated on the head and base with another Thompson-developed alloy and with tempered stems to provide harder wearing surfaces, are standard equipment in the Pratt & Whitney Aircraft R-660 and R-2800 Engines.



Pratt & Whitney Aircraft R-660 Engine

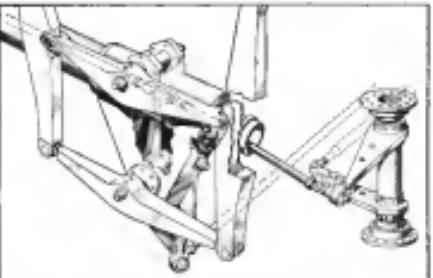


VALVE DIVISION

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YOU CAN COUNT ON THOMPSON FOR ENGINEERING LEADERSHIP



DOUBLE STICK controls (vertical post upper left and center) have been tested at large STOL 2000 Aerospace transport in a series of reducing pilot fatigue.

French Fly Jets From 'Armchair'

Unusual control system in the Grouguard is claimed to reduce pilot fatigue and eliminate cockpit clutter.

[McGraw-Hill World News]

PARIS.—A young French aviation expert has taken dismounting out of the park and installed it in the front office of a high-powered jet fighter. He did it with an unusual system of controls that replaces the conventional stick or wheel.

The invention of Jacques Lescure, engineer and test pilot at SNCASE (Societe Nationale de Construction Aeronautique de St. Etienne), the system is being in the SE 2410 Grouguard, a two-jet fighter prototype.

• **Syntax Diagram.**—Lescure's armchair is really a cockpit. At the end of each arm there is a handle which the pilot grasps. Connecting rods pivoted under his elbow and behind his shoulder translate the movement of his arm into flight directions.

The pilot's arm motions are almost the same as with conventional controls. To gain altitude he pulls back because this is on the handles. To make altitude be pushed forward. To bank he pushes down on one arm or the other arm on the same side and turns the other arm on the other side.

The mechanism of the two arms are automated so that a vertical post on one arm who turns the other to produce a bank a horizontal front on one arm is duplicated in the other arm for a change in attitude.

The armchair is adjustable to fit the pilot. And Lescure has drafted an adaptation of this system for planes in a change in attitude.



ARMCHAIR FLYING by manipulating chair handles is another fatigue-reducing system.

which the pilot is in a prone position. • **Advantages—**It reduces SNCASE claims their major advantages for the armchair control system:

- Clear view of the instrument panel, in a result of elimination of the center console that is usually installed.
- Fatigue reduction resulting from the simplified control and seat.
- Clear cockpit, gains from the elimination of the centerline control column. This should make escape from the cockpit easier.

- Double stick—Lescure is also working to improve strength control before the end of the year and applied his big idea patent on a new type control Sept. 13, 1945. In addition to the armchair controls in the SE 2410 Grouguard, he has built a "double stick" control system which has been tested with this factory made in the SE 2810 four engine Aviafrance transport.

His double stick controls consist of a pair of sticks each carved slightly toward the center and placed one on each side of the pilot's seat. The system functions in much the same way as a conventional system. The resistance is provided at its base so that changes in attitude are produced by means of a stick forward or to the side and back by a similar motion like the turning of a wheel.

This system also gives the pilot a clear view of his instrument panel at all times, but it has fewer advantages over conventional systems than the armchair in reducing pilot fatigue and in clearing the cockpit of the clutter of the stick.

► **Lopatovics-SNCASE** flight tests conducted by Lescure and others, who proved that both the armchair and the double stick, which is another name for the conventional system, have reduced flying still may be necessary for improvement. Tests showed the armchair controls, tried out in the Grouguard fighter, may be better suited for transport planes or bombers than fighters. In the simplicity required of fighters, pilots tend to want more easily and quickly with a stick than with the armchair controls.

Lescure believes the last possible controls for modern planes should be designed to leave the cockpit clear of the massiveness of a conventional stick, should be easily operated by one hand and should have a seat which is closely similar to that of conventional controls. He is working toward that goal, convinced that the type of controls now in general use are in its most important modification in the near future.

GE Sees Jump in '52 Electronic Work

General Electric's 1951 production of electronic devices and related equipment is reported to have more than double the 1950 figure, and will exceed for more than half the Electronic division's business.

Dr. W. R. G. Baker, vice president and general manager of the division and in his annual statement that new plants will begin in 1952 by the military production facilities which were completed last year, commented television and radio manufacturing space.

Dr. Baker's list of a word of pride: GE's large number of suppliers and subcontractors and the cooperation made the expansion possible.

About 35 or 45% of the company's electronic tube production is slated for the military in 1952. Work will be continued on high reliability tubes for radar applications. And Dr. Baker can do as all time sales and production around for electronics in 1952.

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* This company which has progressed to Alcoa, Dodge and Development for 30 years, is now expanding to Kaiser. Diversified and other unusual opportunities to make money, experienced—

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To set up and expand aircraft design checkers area.

CHECKERS

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To maintain control over Design and Engineering Standards and Specified Items.

MATERIAL ENGINEER

To coordinate material and equipment requirements to make aircraft products.

TOOL PLANNERS TOOL DESIGNERS

Reported to Aircraft or Aircraft Tools.

PROCESS ENGINEERS

Experienced in Writing Aircraft Process Specifications.

PRODUCTION ENGINEERS

To provide liaison and coordination between Design, Facilities & Shop.

CHIEF METHODS ENGINEER

To set up and maintain methods groups. Shop and Industrial essential.

CHIEF COST ESTIMATOR

To supervise Estimation in Aircraft Production.

TOOL ENGINEERS

Extensive Aircraft Experience Required.

* Qualified men who can fill the above positions can apply directly to the manager of Employment Management.

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PLenty of Boeing B-47 jet bombers are being produced at its Wrightson plant, left...



TOO FEW deliveries have been made to Air Force to permit combat training of crews.

Stratojet Delays Worry Air Force

Delay in delivery of Boeing B-47 medium jet bombers is beginning to worry the Air Force, which has been forced to restrict its bombing activities in transition.

There have been no similar training because Air Force never had an equivalent quantity of B-47s.

Plenty of the surprising bombers are being produced, but inventory problems delayed the start of subassembly and final delivery of completed bombers to the Air Force.

Bigger Problem.—The B-47 is designed to do the job it is today's modern weapon that the B-29 did in World War II, to fly at 40,000 feet and instead of 13,000 at one-third the time.

Boeing has had to be developed to replace the conversion. That has been the biggest problem. Training engineers report that 25 cycles of flying have been necessary to get the job.

Other Problems.—And there have been a good many other problems. For instance getting bomb bays open and closed at 350 mph plus. That problem

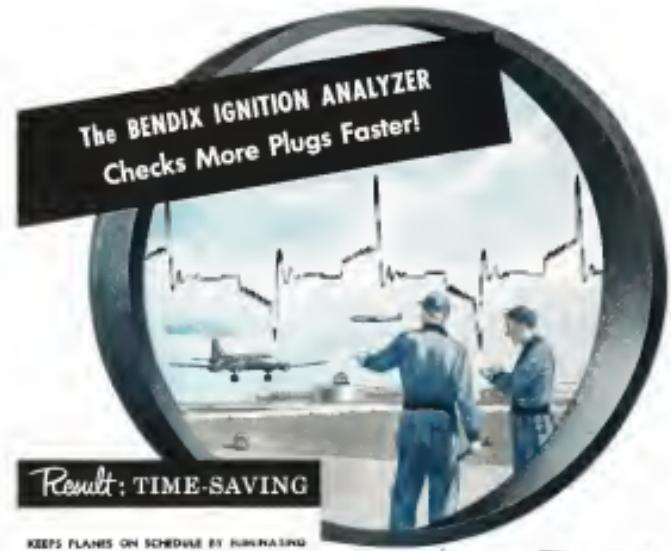
was overcome, only to find another how to keep the "plumbline" from being torn out when bombs had opened.

Delays in engine and component parts delivery also have been reported. Shuttles of both skilled and unskilled workers to Wrightson, where nearly full-scale production is underway, have been steady. Now, J. Wrightson had 311, 480 persons employed, out of a total population of 740,000. Avord and parts manufacturers now employ 37,150 and report they will need an additional 4,500 by February.

Big Answer.—To speed up training of crews, USAF purchased the Wright-McDonnell Airport adjacent to Boeing's B-47 plant, and established a jet bomber training base.

Training has been confined to transition, with 7-10s, then their work to 35s.

Other Problems.—And there have been a good many other problems. For instance getting bomb bays open and closed at 350 mph plus. That problem



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Even before the wheels touch the runway, the ignition fault has been pin-pointed and a maintenance crew stands by to make a fast repair. Minutes later the ship departs on schedule. The fast, certain repair job was possible because the trouble shooting was done in flight, by the operator of a Bendix Ignition Analyzer. While walking a routine check of several plugs the scope reading showed a trouble pattern. The operator quickly analyzed the location and seriousness of the trouble and the word was radioed ahead. Meanwhile, the pilot reduced power of the anti-turbulence engine to cool it in flight and ready it for maintenance. Just such a case is the reason why one airline has reduced turn-around time by 50% with the Bendix Ignition Analyzer. It can do the same for you and much more besides.

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The Bendix Ignition Analyzer is available for either aircraft or ground equipment installations. It can be used with either high or low tension magneto or battery ignition. It is the ignition analyzer that can provide quick plug failure detection . . . make an efficient check of more than 30 spark plugs at a time and do so in a large, easy to read screen . . . yet it costs less than unneeded analyzers.



NOW! Full use of VHF radio by owners of executive aircraft

Collins "two-carrier" pilots are no longer confined to VHF frequencies of 122.4-122.6 megacycles for in-the-ground radio communications. By amendment of an Rule and Regulation Governing Aeronautical Services, the FCC has enabled all owners of aircraft regardless of type to make certain frequencies within the band 118.1-126.7 megacycles.

Not only that! Under the new Controlled-Max rule, pilot are now authorized to use phone 100.3-6 to get materials with which to fill orders from corporation plane owners for Collins 17L transmitters.

The businessman can now equip himself to operate in the same way under existing conditions as the scheduled service.

The Collins 17L transmitter provides transmitting facilities on all channels reserved for aircraft

communications in the VHF band. Its frequency range is 118.0-125.9 megacycles, and all of the 150 channels assigned in this range are easily selectable over a simple and positive manual control system. The power output on voice is conservatively rated at eight watts. With this power, and the greatly increased number of frequencies now available, the pilot is assured that communications will be received and answered at the lowest air density.

The 17L is a companion to the 51R navigation receiver with which many executive planes are already equipped. The pair provides reliable two-way radio telephone communication.

We will be glad to send you a more complete description of the 17L transmitter on request.

For reliable radio communications, it's . . .



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Red Rockets

- Peenemuende center is back in full operation.
- Russians are testing four missile types there now.

By David A. Anderson

Four rocket-propelled guided missiles, including the anti-aircraft weapon V-2000, are currently under test in the Rumanian city of Peenemuende, former center of German guided missile activities.

Besides Wasserfall, the Reds are working with the A9, which is a version of the V-2 rocket, the A5, half-scale V-2 used for control development, and an unidentified rocket of the V-2 type.

Peenemuende itself has been heavily fortified and has a garrison of about 80 MG-151 interceptors assigned for its air defense. Launching strips and new facilities have been added to replace and supplement those destroyed by German engineers before the Russians took over the city.

► **Russia's Effort**—what has been going on behind that particular Iron Curtain has been kept secret during the past 61 years. But like the U.S. atomic bomb project during the war, the physical part of the establishment at Peenemuende is just too big to hide or to camouflage, effectively. Sooner or later, information is bound to leak out. And here it is, what is currently known about the Red rocket station.

First, Russian development work seems to have started where that of the Germans left off. The chief of the Wasserfall and the A5 would seem to confirm the belief that the Germans had the best fire to undergo development, according to the Peenemuende docs.

Second, launching strips have been built, provably, by means of the V.L. or Martin Matador type. These policies, aircraft are launched on an inclined ramp or from an elevated weighing deck. There are some kind of wind tunnel to get up to flying speed.

Part of these ramps are on the east end of the Peenemuende North area, and the rest are on the shore of the Elbe River, in the government "West section." These may be located on the site of the Lubitzsch's camp for the V-1 launch work during the war.

► **Missiles**—Wasserfall (air-to-ground) is a rocket-propelled anti-aircraft weapon. It weighed approximately 5,500 lbs., was about 25% its overall length. Its rocket motor used nitro-

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Lockheed

BOOSTS PROFITS FOR AIR CARGO OPERATORS

Air freight traffic has increased 507% since 1948, continues to grow at a rapid step. During this period, Lockheed engineers worked steadily on the problems created by this fast-growing business and have come up with much-needed developments.

Some of these developments were recently previewed by air freight experts and industry officials in a 3-day seminar held at Burbank. It was revealed that Lockheed (2) has a new Super Constellation cargo plane designed to reduce freight carrying costs, and (2) has thoroughly analyzed the problems of loading, ring down, unloading and handling of freight at airports. One emblem was Lockheed's merchandisedly operated scale model of "the ideal air cargo terminal," which has attracted no small attention.

The new Super Constellation cargo plane is the most highly mechanized freight aircraft ever designed, due to its exciting advantages:

1. Super maneuverability handling problems with three engines (larger than an all-metal transport) from a load in maximum maneuvering condition to a full take-off weight of 36,000 pounds capacity.
2. Greatest "range across the ocean" than any other airplane.
3. Increases carrying capacity, both in total freight space and weight.
4. Greatest passenger profits because of its low direct operating costs—actually 4.5 cents per ton-mile.

The Super Constellation is the result of a decade of fine design research of Lockheed. It is the most advanced and reliable airplane of the world. Imagine Constellation transport with greater size and greater operating economy.

It is 80 ft long (longer than the standard Constellation).

It will carry 30,000 pounds, or nearly 20 tons, across the oceans.

It will carry over 20,000 pounds nonstop from New York to Paris.

It has an usable cargo area totaling 3,200 cubic feet, equal to nearly three standard refrigerated vans.

And its record overnight freight profits make it the least expensive jet plane for long-haul flights. It can fly at 400 mph (over 600 ft per sec) in 8 to 1000 ft per minute. It has higher density cargo and a wider variety of cargo.

Military versions of this airplane already have been ordered in large numbers for both the Air Force and the Navy.

development area, and included rocket launching platforms. South was in laboratories and construction of test vehicles, then the buildings were moved to the pass floor while blankets the eastern coast of Ukraine.

The construction of the Red Zone which covers some 100 km² and that Pervomaisk has been almost completely destroyed by the Germans, and the line for whom covered the rest of the destruction. And so the town of Kartash fell in weapon development activities at Pervomaisk.

► **Expanded Airfield**—In addition to the Russian nuclear weapons development, there has been considerable expansion of the German-built airfield at Pervomaisk West. It is now a three-run way field, the main east-west runway is intersected in each by a pair of strips at about right angles. Hangars are located south of the main runway.

Against the main runway, two sort of a cross-shaped concrete structures, because the western end with a radio mast and the eastern end with an antenna system which is about 50 ft high.

Earth embankments along the eastern side of the field, height of the embankments at about 5 ft. The MiG 15s standing in the embankments are normally camouflaged with nets.

During the exercises held last fall, the Red had some 150 planes stationed at this base, several couple weeks ago it is about 40.

Additional defense units include two

illustrations of 9000 mm aircraft pieces scattered about 300 ft apart along the southern coast. Red army units situated in the sea base large numbers of light anti-aircraft guns with no possible land set of gun positions.

A large number of tanks (which is the last German Republic's navy) is situated at the shore of the Pervomaisk with armored tracks of about 200 km deployment.

► **Improvement**—Regulations of future plans for Russian missile development, it seems certain that the rehabilitation of Pervomaisk and the use of the facility there make it important right now.

Recent information from European sources says that the Russians are going to concentrate their missile development work at Kirovograd (located in the German city of Kamensk 35 km NE of Belgorod). While this transfer is completed, Pervomaisk could continue as an educational facility, or as a test facility.

The timetable for that transition and the type of expansion work required at Pervomaisk can be a very important clue to Russian embassies with guided weapons.

Foreign Interest In Stall Indicators

British, French and Belgian assault transports are showing increasing interest in pre-stall instrumentation at



HUGE VULCANIZER FOR AIRCRAFT FUEL CELLS

Large piece of vulcanizing equipment for large aircraft fuel cells recently was moved into B. F. Goodrich plant in Akron. This vulcanizer, a 40-ton steel cylinder 21 ft long and 12 ft in diameter is shown

as it was packed off the car for setting on foundation. A 14-ft. revolving ring on the vulcanizer had to be shipped separately. Equipment was manufactured by Steuben-Wells Corp., Willsboro, N.Y.

coming to Leonard M. Greene, president of Safe Flight Instrument Corp., White Plains, N. Y.

Prototype installations for 16 different types of foreign aircraft already are being developed by the company. The manufacturer's site:

- **England:** Vickers-Armstrong, de Havilland, Fairey, Gloster, Hawker, Hunting, Parnall, A. V. Roe.

- **France:** Avions Marcel Dassault, Société Nationale de Construction Aéronautique du Sud-Est (SNCASE).

- **Italy:** Marchi, Fiat.

During a recent trip to Europe, Greene inspected the big SNCASE 2010 transport, which has been fitted with the Safe Flight warning system and

reports have come in on its possibilities.

New Industrial Scholarships Open

National competition for 34 Stein Fellowships in the executive development program at Massachusetts Institute of Technology has been announced. Nomination by the employer is a prerequisite; one successful candidate must be granted a year's leave. Applications must be made at MIT by Feb. 23.

Candidates must be between 30 and 35 years old, with five to ten years of experience. Fellowships will be in residence

at the Institute from June, 1952 to June, 1953.

Qualifications for selection include unusual ability, intellectual capacity, sensitivity to the social and civic implications of industry and potential for influential leadership.

Fellowships, awarded on a non-priority basis, provide for two years of residence, subsistence and training at the State University of New York's Department of Mechanical Technology—a part of the State Institute of Applied Arts and Sciences. Stipends will be supplemented during the summer months by an on-the-job training in mass bearing plants.

THRUST & DRAG

Capt. R. C. Robins suggested to Captain Viewpoint for Dec. 24, 1951, that oil dilution increases the chances of combustion. He said, and rightly, that oil dilution by gasoline changes the flash point of the oil. But there is one other side to the story. Spontaneous ignition temperature is important a factor in this as it is the flash point, which is only the temperature at which vapor ignites spontaneously in the presence of a flame. Lubricating oil is itself about a spontaneous ignition temperature around 1,000° Fahrenheit, and at 1,000° Senior NACA tests showed that in an oxidation of 200 ppm (which would be comparable with the *base* through the nozzle of an engine cooling air) oil ignited at 1,030°F and gasoline went to 1,300° before it flamed spontaneously. Actually, the propagation of gasoline added oil dilution should not take the spontaneous ignition temperature of the oil appreciably. What all this says then, is that oil (gasoline) spontaneously ignites when the oil dilution is greater than the dilution where it is not appreciably higher temperature, and that in the presence of a flame all bets are off anyway.

One of the most useful of government publications is a new bibliography of material dealing with gas turbines and jet propulsions, and compiled at the National Bureau of Standards. Books published from 1939 to 1950 are listed and published from 1940 to 1950 are acknowledged. You can write the Technical Division, the Government Printing Office, Washington 25, D. C., for 25 cents. All the NBS Circular 565 bibliographies of books and published reprints on Gas Turbines and Jet Propulsion.

THE BETTER THE

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Packard has been associated with the aviation industry since its inception, for it was Packard wiring that was used by the early aircraft experimenters and pioneers.

As new problems arose pertaining to the safe and efficient conduction of electrical energy, Packard was ready with new processes and new equipment with which to meet them.

Small wonder, then, that Packard cable, so highly regarded by the industry as a whole, is the preferred wiring in both commercial and military aviation.



Packard Electric Division, General Motors Corporation
Warren, Ohio

and Rocket Power Plants, by Ernest F. Fock and Carl Halpern



Engineers were asked to help high school high school teachers in their professional development, a plan being organized in the Engineers Council for Professional Development. The Council also urged engineering schools to make substantial improvements in their courses of study in that what they are teaching does not become obsolete during the next five decades. Colleges were asked to concentrate more on the basic engineering sciences—math, physics, mechanics are examples—than on the engineering arts which speculate on one particular subject.

Benchmarks for the state of Beach engineering design development include the first aircraft engine, the H-1000, a 1500 engine from packed parts of Viking propellers. Some of the components had as high as 3,000 psi in maximum stress. The engine was then run through a complete critical test which found 110 hr. The test was a success. And the propeller parts were suitable in the limit set for one aircraft about to go into service. Billed as extremely hoping for a 1,000 hr. rating for over half period.

A small aircraft wind tunnel for research and extraction has been placed into operation at Research Polytechnic Institute, Troy, N. Y. Powerplant is a new single Packard V-1610 (Koddy Rock) propulsive engine which drove the tunnel up to Mach 1 through combination of pressure and vacuum extraction. The tunnel was constructed and tested under the Institute's Department of Aeronautical Engineering. Test sections are not specified but is presumably small and two-dimensional. It would run, of course, with the test Mach number desired. Schlieren and shadowgraph apertures are available.

Soriano called at the office of Mr. J. P. Shipp to take a dissolution rate of 492G (AVIATION WEEK, Nov. 26, 1951, p. 41) and write a letter asking if we were authorized to check these "prestressed" statements put out by the Air Force. Not having immediate access to check, we based on the whole business on the Technical AFM people who confirmed the dissolution rate. And then they added this sentence: "You may be interested to know that human subjects have been subjected to dissolution rates of as much as 1,100G per second without detriment or side effects."

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Conforms to requirements of ARM-18. Equipment includes magnetic clutch and brake, radio noise filter, metal oxide and torque limiting device. Rated motor hp is $1/2$ at 9000 rpm continuous.



EMERGENCY STAND-BY MOTOR for use on Supersonic Research Aircraft

Designed to operate under high ambient temperatures up to 50°C at 50,000 ft. altitude. Duty cycle is 10 seconds on/10 seconds off. High temperature materials used throughout. Motor weight, including gear box, is 22 lb. 2 oz.



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for Jet Wing Flaps

Two actuators are interconnected by flex shafting. Single brake operated by eddy current provides quick and accurate positioning. Either motor can safely operate entire system in emergency under any condition of ambient temperature and continuous operating load with supply voltage as low as 26 volts. Weighs only 8 lbs. 3 oz.



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These dual motor arrangements use a small, continuous duty motor operating through a gear reduction to turn circuits in instrument flight, and a large intermittent duty motor for manual operation in maneuvering.

One unit is a complete motor actuator. The small, continuous duty motor of 1/10 h.p. provides a rate of travel of 0.116° per sec. to the servo jack, the larger, intermittent duty motor of 2.5 h.p. operates servo jack at a rate of 17.000° per sec. Normal operating load is 1,100 lbs. 30 volt operation. Equipment includes overload and travel limit switches, radio noise filters, position indicator and rate-measuring shaft.



The other unit illustrated employs a small motor of 1/10 h.p. with integral gear reduction and a large 3/3 h.p. motor with gear drive of 12,000 rpm.

TECHNICAL BULLETIN



Special Actuators and Motors for Today's Special Aircraft

Fuel-proof power units to operate controls in conjunction with the automatic pilot are primary factors in the advancement of automatic flight. EEMCO helps the industry build for the future by designing and manufacturing motor actuators that keep pace with the far-reaching demands of planes on the drawing board.

The EEMCO designs briefly described in this bulletin are a few of the more advanced units designed and produced during the last year in cooperation with leading aircraft manufacturers.

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Can be supplied with integral gear box and standard A.N. mounting pad for operating lower speed pumps.





CONVAIR'S EL SEGUNDO PLANT is 9,000 ft. long. Assembly line shown lower left, completed B-36s storage at upper right.

Convair Set to Turn Out B-60 on B-36 Line

Quirk changeover to eight-jet production possible because 72% of parts identical to present bomber.

By Irving Stone

It's Worth-Convair's giant swept-wing eight-jet YB-60 probably will be fabricated on the present B-36 line, if the company gets an initial production order for the new bomber. Adoption of this production line for the B-60 should be smooth with little interruption.

One of these aircraft, however, except for the Pratt & Whitney J-37 engine installation, was completed last October, after a relatively brief eight-month period in Convair's experimental hangar adjacent to the main plant. A second ship also is under construction, probably now at the near-completion stage. The first YB-60 could have flown before January, 1952. Convair officials say, if engine had been made available.

► **Bolt-on Power-Bass-Ross** for the quick fibreglass job on the new aircraft is that about 75% of its parts are identical with those on the B-36. Diesel parts for the YB-60, except for some minor items, were made up on the B-36 fibreglass line from new sheet tools to accommodate the changes made in

the transition from the basic B-36 aircraft to the YB-60. Accordingly it will cost but a few plane changes if it is planned to make this aircraft interchangeable with the B-36 series, but a new development will be required in the new configuration and greater performance—the YB-60 should have about 30,000 lb thrust available from its eight J-37s, as opposed to the equivalent of about 22,000 hp in the B-36.

► **Convair's-Bass-Ross** for the YB-60, from site of the cabin to near the end of the tail, and also the center portion of the outer wing, remains the same as the B-36.

The nose cone is lengthened to accommodate some equipment, and the tail cone is modified to house a landing chute and support a tail wheel.

At the extremity of the center portion of the outer wing a fairing structure is mounted to give sweep to the leading edge of the outer center section and outer panel. A tail on the center part of the outer section can

trace the leading edge sweep in the fairing. Also, over the center part is another fairing for the wing top surface.

The gear structure for the J-47 as on the B-36 is not used on the YB-60. A new arrangement has been built for the J-37 installation.

► **Trimmed Job**—Until orders for the B-60 are obtained, Convair continues to concentrate on the B-36 series, but a new development has been planned in the new configuration and greater performance—the YB-60 should have about 30,000 lb thrust available from its eight J-37s, as opposed to the equivalent of about 22,000 hp in the B-36.

► **McBrooming**—McBrooming the B-36 bonds the sections together after they are taken from pressuring bakes (top right). Subassembly and major assembly of B-36s (bottom left, and at lower right is an overall view of nose forward bulkhead assembly in foreground).

► **McBrooming**—The fabrication job is a relatively simple one—the raw nose rad column is at one end of the 4,000 ft line, the finished piece comes out at the other end.

The highlight of the fabrication job

is

when you pass

the assembly station and see the large diameter 162 in. fairing, the nose wing that rises to a 79 ft root thickness and stretches across 230 ft.

Essentially most of the problems in

valved in putting this enormous

bomber together are similar to those

encountered with other planes. Du-



LATEST FLIGHT VIEW of a Convair YB-36, reconnaissance B-36, equipped with four jets, on pusher-type power engines.



ALONG ASSEMBLY LINE—McBrooming the B-36 bonds the sections together after they are taken from pressuring bakes (top right). Subassembly and major assembly of B-36s (bottom left, and at lower right is an overall view of nose forward bulkhead assembly in foreground).



AVIATION WEEK, January 14, 1952

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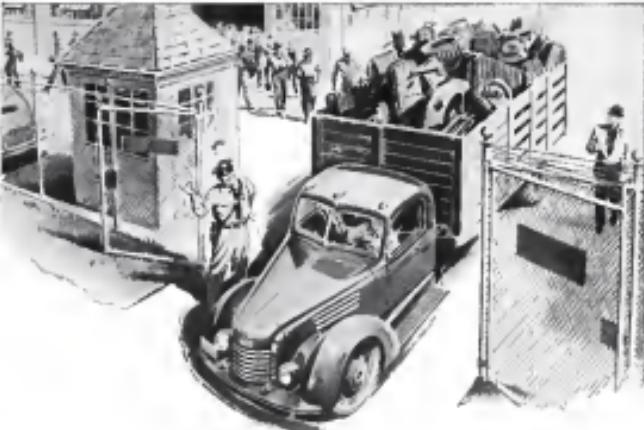
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Installations supply a number of degrees. The manufacturing cycle is longer, but great number of ship-made parts (60,000) and difficult assemblies (5,500) for each plane add to the volume of trouble which would be normal for the industry.

► **Extreme Conditions**—But the commercial know how required for the B-52's blend of design and production is po-

color to that particular plane. Fly-on to an altitude of 50,000 ft. (125 to 30,000 ft. higher than for transports) in a relatively short time may be associated with a temperature change of 20°F—and bring never problems calling for special design advancements and production attention for almost everything that is handled up to the height. Not only are there more parts and things in the B-52,



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NOSE REACHES high and always an R3-HD is ready to be pulled out of assembly plant, but the star at altitude is longer. Just one example of the production difficulties is found in solving the integral fuel tanks. Here, these are installed in a 6-ft. hydrostatic tank at a height to a substantially lower height in the usual case of aircraft.

And because of the inherent use of the aircraft and the materials, aircraft, engines, more extensive fairings, conventional, and each of these changes can cause a unique "one reason" in the production line.

Yet the learning curve—production efficiency—is gradually elevated with the industry average for all types of aircraft, say Consolidated Vultee Aircraft Company.

►General Layout—The Ft. Worth plant originally went into operation a March, 1942, as an assembly facility for B-24 Liberators. It was 520 ft. wide (two 40-ft. high bays), 250 and 120 ft. by 4,900 ft. long. In late 1942 it had become a manufacturing plant and had come a subcontracting aircraft plant and a 350-ft. high bay. The original 4,000-ft. stretch, the new bay was used for the manufacture of production tools and parts for the B-24.

The B-26 production scheme utilized

the existing heavy machinery installations in the fabricating area, because the cost of moving these units would have been prohibitive. The height of the B-36 dictated the use of the high bay, and the wall order of 130 (in 1943) and the low production rate on greatly planned to fit the long assembly line. It was decided to build a separate high production rate tool which would shorten the line. But the production scheme does then requires transportation distances for leading materials and parts into the line.

Here's the overall flow plan for producing the B-36:

- Initial Work—Tooling, department and fabrication men are assigned to each other. Tooling is housed in a two-tier arrangement with the ground floor used for the lower, simpler tools employed in making the production tools. The upper section accommodates light materials for making templates, form blocks, etc.

Raw stock is fed to the fabrication area and from an offshoot materials warehouse. To this area are applied the various processes for making up the detail parts for subsequently—shaping, forming, drawing, stretching, machining.



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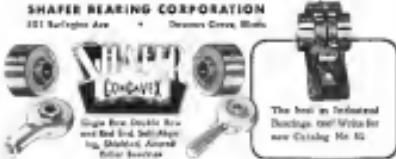
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From fabrication, most of the parts are built by clevis to a substantially accurate, dethreaded state. After working they are brought down by clevis or monolithic, according to use of non-porous, and sound directly to the major assembly less shifting the fabrication.

Some of the subassemblies are seated, turned to stock sizes, serving the final assembly process.

► 4,000-ft. Line-Fire: upstream, in fabrication to insure assembly the flow is across the width of the building to about the height of 4,000 ft. line begins, with major assembly up start.

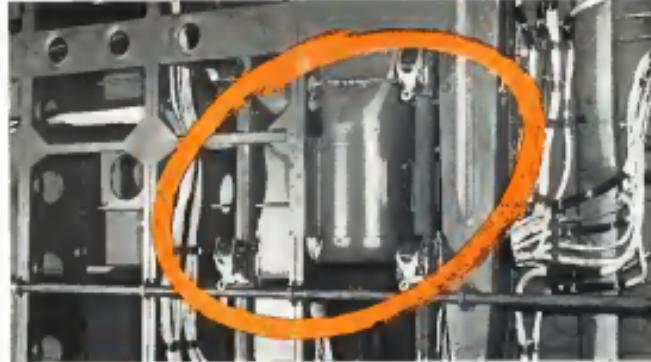
From here, the fuselage and wing components (base, lower fus. tail, horizontal and vertical stabilizers, and wing center section) go forward to outer mounting stations. Two of these stations are used, to span the width and provide an assembly better to pick up lugs on production.

Major engine propellers enter the final assembly line, comprising 11 stations (down) and (parallel) to them, are the axes for landing of components installed on this line—airframe, armament, outer panel and engine (expansive seats are used for main wing ducting and radiators to jet and piston plants). In addition to these leading areas which serve eight of the final assembly stations, parts come into the line from a subsequent parts warehouse. Reaching these final stations of the 4,000-ft. line are tanks for checks of the various aircraft systems, hydraulic, electrical, etc.—and Air Force production inspection.

► Check Routine: From the assembly line, the B-56 is tested to various check stations—environment for gas test, nuclear shock, engine run, engine runup test for shock of rotation using propellant drives.

After this the plane goes to company flight, then is referred to assembly division which were the subject of flight squads. Nine trips in AF are performed, then AF inspection flight which is followed by route to base equipment area for loads tests, mount and engine checks. Final step is to delivery gear for AF flying crew. That's how Convair puts the B-56 together and gets it to the AF.

In this design and production effort at Ft. Worth, Convair employs more than 30,000 people, exceeding the World War II peak figure 30,600—achieved in November, 1943, at the height of the B-24 output. Of the present figure, 5,000 are women, more than half of whom are in the factory, often in production control and testing. But Convair employs not only less than half those engaged in the peak B-24 effort.



JOY AXIVANE® AIRCRAFT FANS provide ice-protection for Parked Packets

The Fairchild Paket must be ready at all times in every aeroporto, triplex or supply in forward areas. The wings of parked aircraft, however, sometimes become coated with ice or frost which may seriously impede their cold. To eliminate this possibility, Fairchild engineers designed a forced hot-air system for aircraft deicing while the plane is on the ground. Two large AXIVANE aircraft fans, each 40 inches in diameter and weighing six eight 440,000 BTU hours. The heated air can be belted either into the wing panels or into the cargo and cabin spaces. No space is wasted by the fans, since their compact size permits them to be installed between the survival fuselage frames.

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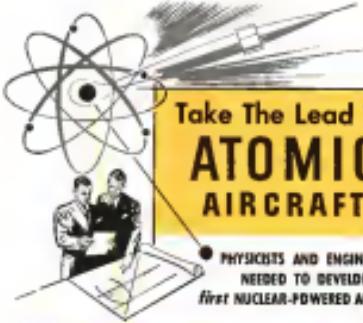
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Military Aircraft Roll Down the Lines



BOEING B-47 STRATOJET assembly sections are arranged on double-decker assembly lines to speed installation of complex systems and reduce equipment. The crew compartment in one of the B-47's four major loading sections, the others being the engine cowl, landing gear and tail section. This crew was seated in the tail. Some sections for the big aircraft, however, production now, may be passed from the tail. That \$2,000 part goes into the big plane, exclusive of tools, bolts and original components. New type aircraft assembly lines and external final line to be kept free. Subcontracting accounts for about 40% on a dollar volume of the B-47's assembly. Wichita plant makes over 80 percent main landing gear sections, all of wing except the forward sections.

VOUGHT F7U CUTLASS are seen on flight test assembly line at Dallas, which is housing big, long fuselage of the 700 high-climb fighter for the Navy. Dimensions are twice as great as performance ever relatively slower World War II fighters. Cutlass need 100,000 hours work, and a 100-hour test line. Necessity of incorporating many more areas of equipment complicates the process. Staff working over in a fighter-type aircraft is still another unique problem. Latest production version of the Cutlass, the F7U-1, is powered by two Westinghouse J46 jets rated with afterburners. One of the most radical planes yet devised for squadron service, the Cutlass typifies the new high performance fighters being prepared for carrier service with the fleet.



LOCKHEED T-33 jet trainers are completed (left) at Van Nuys, Calif. In production for three years, the two-place T-33 was to go on to receive revised assembly line late Jan. 2 in an attempt to meet the demand from USAF, Navy, Marines and, at least, four foreign air forces. The new production schedule will provide a production average of 40% to 50% greater output, 20% in working space, 10% in major tooling time reduction from 12 to seven as follows: future tooling required, among other benefits. Such gains are possible when sufficient orders are placed to permit major re-arrangement of production layout and use of more output tooling.

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EQUIPMENT



CORNER view of Los Angeles Airways helicopter assembly shop.



MAIN ROTOR hub assembly of an LAA Sikorsky S-51.

LAA Uses Many New Operational Methods

Airline modifies its copiers to meet needs; sets up a simplified system of maintenance routine.

By George L. Chastain

Los Angeles.—Operating a helicopter airline is comparable to running a model shop. There is no precedent to follow and you have to invent practically everything you do," Clarence M. Belote says.

Belote ought to know. He is president of Los Angeles Airways, first helicopter airline in the world.

Currently delivering mail and freight with three Sikorsky S-51 copiers, the airline has 100 percent of its aircraft home to the basic surface to hang it up to maximize utility for mail pick-up and delivery operation. Here are some of the most important ones: educated at the airline's main overhaul and operating base at Los Angeles International Airport.

■ Exhaust system was moved to the right side of the helicopter to keep the exhaust fumes out of the cabin headliner.

■ Sight fuel quantity gauge was about two-thirds the depth of the strake available. The transparent tube shows fuel quantity, but there are no moving parts to break down. This, incidentally, is an example of the opposite approach and tends to make

the characteristic of Belote's planes plus the more an airline should operate.

■ Fuel booster pump modifications turn the booster pump on automatically in case of main engine fuel pump failure. This was deemed necessary because the pilot is so busy on takeoff that he should not be required to turn the booster pump on manually.

■ Fuel transfer system has been installed to give the pilot more control over the craft's center of gravity.

CC is a central position in helicopter operations according to LAA officials.

The two fuel tanks are located in the forward left of the engine and transferring fuel from one to the other will have considerable effect on the CG.

■ Cooling modification has changed original cockpit-type prop to belt type. Now any individual part may be replaced without disturbing adjacent parts.

■ "Boots" modification extended main caps of the after fuselage from a total of 145 lb. to 260 components with capacities of 150 lb. (upper) and 150 lb. (lower) respectively.

■ Oil tank, bottom and distilled oil filter have been moved forward of the engine to give more space and take care of CG requirements.

■ Head and spotlight were modified to allow weight and delivery. The flood lights are the heavier general type. The spot lights are to give the pilot a lead for the main landing. Headlights on the left main landing gear eliminate fire and oil baggage compartments.

■ A flight recorder, made by Bell and Howell on film, is being tested experimentally to keep tabs on maintenance. Techs are too new to prove conclusive.

■ Tail rotor guards were modified to protect the anti-torque rotor from insects and other hazards.

■ VHF radio has been installed. It allows the pilot to be in constant communication with LAA's operations office at Los Angeles International Airport.

■ Maintenance. Clarence Belote said that, after 27 years of work, he had put together a maintenance system that was a model of simplicity and a masterpiece for its dimension of much needed paper work.

It might be termed the "Kiss" system.

The maintenance manual contains the usual detailed description of each job to be done on the helicopter at a given time. But it goes one step further. Through a series of lines or symbols, correctly M-1 to M-18, each operation is tied in directly to an other action

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ONE OF THREE 3-H. choppers used by LAA to carry mail and cargo in Los Angeles are associated with that particular job.

For instance, when job M-1 is performed, the job M-1, has that operation to the accounting, engineering, training and any other department that might be concerned with job M-1.

Then each job performed on the copilot is usually wrapped up as individual jobs each held together by a line. And Bellanca has largely on every front of his whirling valve by not allowing a single change in the instant without his personal OK.

Clear definition of duties allows us choices to make the most use of our time. Bellanca put in 21 days of time to get the job done, saving some "hands."

As a matter of interest, and as a basis of comparison, for low-flying helicopter operators (and patented helicopter users), here are some typical times for the surface, engine and components as revealed in Harry Bremner, Supervisor of Inspectors and S. E. Brown, General Maintenance Supervisor:

■ Inspection periods for the engine and airframe are Top (per flight) daily, 40, 80, 120, 240. Annual inspection is scheduled at 480 hr. for the surface side.

■ Airframe major overhaul is set at 5,000 hr., the engine (R-985) 1,200 hr. Application is in hr. for engine time or proven to 1,000 hr.

■ Main rotor head is examined at 240 and 480 hr., the main gear box at 900 with application for extension to 600 hr.

■ Main rotor has the same inspection periods as the airframe with a main blade life of 2,200 hr.

■ Tail rotors are inspected at 480 hr. Average number of hours accumulated on the 5-Hs to date is 4,500.

■ No Bellanca found that his copilot "spends all his time on wages, materials and good equipment —

doesn't waste any on fancy stuff." We as a compact organization, obviously could not do it.

And a host of LAA's facilities are free of the lack of bulk. Maintenance shops were simply equipped, but as an accessory, expensive equipment centralized in fragrant aviary. Offices were simple. And an Edsel Telecommunications enabled one girl to handle the correspondence for ten men plus handling the details of numbers to the chief accountant. LAA officials estimate the system saves them costs, 100,000 to 120,000.

► On-Time Performance—One of Bellanca's striking features is how his big helicopters operate on schedule. To this end, an automatic flight timer is taking shape in the shoppe. The device will turn on a light whenever a helicopter is due at a stop. When checking in by radio will enable the checker to tell at a glance how close to the all important schedule he is.

A 24 hr. radio round one of LAA's or Bellanca's planes have apparently come, but actually have enroute and no time for the operator. The radio goes from the LAA airport to Coney Island, via several stops to Monroe, on the south into Missouri, on several more stops to Peoria and Clinton to the eastern terminals. See Bremner's route to Barnegat and Coney, then look to the right.

In spite of the numerous stops, including one to take on fuel, the copilot was never apparently off schedule and arrived at destination exactly on time. The postage stamp size helipads were located in various sorts of locations. Some were at small, private airports, a couple at big grounds, some in back yards, vacant lots or framed-off portions of school playgrounds.

Each helipad is equipped with a cushioned wind sock. At a high chromo-



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